



Water conflict and cooperation in Southern Africa

Larry A. Swatuk^{1,2*}

The water resources of southern Africa have featured centrally in the global literature on water conflict and cooperation. This scholarship has appeared in two waves: (1) the post-Cold War focus on resource scarcities and the possibility of 'water wars' and (2) the mid-2000s rise of fears surrounding the impact of a changing climate on water resource regimes. The first wave, in the region, ironically resulted in a significant body of scholarship demonstrating the predominance of cooperation rather than conflict. The second wave has served primarily as a spur to better governance and management, and to better integration across the policy making landscape. Running as something of a countercurrent to these dominant trends, is critical scholarship that focuses primarily on water rights and regards conflict as a necessary means to more equitable resource access ends. A key challenge for scholars of water conflict and cooperation across the region is, therefore, to reconcile both theoretically and practically the macro studies of largely transboundary water politics with the micro studies of social struggles for water in urban and rural settings. The article concludes that for a third wave of studies to add value to questions of regional water security, scholars must (1) recognize the simultaneous presence of conflict and cooperation, (2) acknowledge that not all conflict is bad, neither is all cooperation good, (3) approach the analysis more systematically through hard data gathering, and (4) read beyond their disciplines in order to more fully understand the social dynamics of the region. © 2015 Wiley Periodicals, Inc.

How to cite this article:

WIREs Water 2015. doi: 10.1002/wat2.1070

INTRODUCTION: RESEARCH REFLECTS GLOBAL TRENDS AND FOLLOWS FUNDING

It is very likely that water will become a contributing factor to [Southern African] regional instability as demands for water approach the limits of available supplies.¹

Water offers one of the few paths for dialogue to navigate an otherwise heated bilateral conflict.²

The effects of environmental changes on violent conflict appear to be contingent on a set of intervening

economic and political factors that determine adaptation capacity.³

When one mentions 'water in Africa', a number of common images come to mind: women standing in long queues, livestock crowded around a water point in an otherwise desolate environment, cracked earth under a blazing sun, flooded valleys, a land of extremes. For perhaps the last 25 years, there has been a great deal of speculation as to whether these persistent water problems will one day lead to violent or acute conflict, within and between states. Yet, it is increasingly empirically demonstrated that conflict and cooperation occur simultaneously in a variety of forms,⁴ and that there is far more cooperation than there is conflict where shared waters are concerned.^{5–7} As Wolf et al. point out, 'water is an irritant and a unifier'.² Due in part to its unusual characteristics—e.g., non-substitutability, bulkiness—conflict most often times

*Correspondence to: lswatuk@uwaterloo.ca

¹School of Environment, Enterprise and Development, University of Waterloo, Waterloo, Canada

²Institute for Water Studies, University of the Western Cape, Cape Town, South Africa

Conflict of interest: The authors have declared no conflicts of interest for this article.

is a precursor to cooperation.⁸ This essay reviews this literature, and these ideas, in the context of shared surface waters across the continent-based member states of the Southern African Development Community (SADC^a). While groundwater governance and management is an emerging world water issue, it features marginally in the water conflict and cooperation literature in the southern African region.^{10,11}

Let me state from the outset that there are no systematic, large-n studies of either water conflict or water cooperation in the SADC region. There are several, largely anecdotal, broad overviews of 'trends' in conflict and cooperation at the interstate level.^{12–14} There are also quite a few speculative exercises in impending regional water conflicts. These latter studies have come in two waves: the first wave was initiated in the early 1990s by global-level speculation on population, poverty, and environmental degradation/resource scarcity.^{15–27} The second wave arrived about a decade later, initiated this time by questions of climate change and adaptive capacity, also a global governance preoccupation.^{28–37}

Perhaps reflecting external research funding availability—from donor states, IFIs, foundations, and numerous intergovernmental organizations—there are a great many single-case and comparative case studies of water cooperation at various scales.^{1,38–46} This trend is complemented by several streams of 'cooperation for peace promotion and conflict avoidance'.^{22,47–55} The few cases that focus on discreet instances of interstate conflict all locate themselves within the 'lessons learned' school of policy studies.^{46,56–61}

At the substate level, there is a burgeoning critical literature of the conflict-inducing decisions made by policy makers in particular SADC countries, with an overwhelming dominance of South Africa as a case study.^{62–67} This scholarship emanates from social science and humanities departments—politics, sociology, geography—and tends to have little overlap with the 'conflict and violence' perspective of scholars of international relations. The former tends to frame 'conflict' within the ambit of citizenship and rights,⁶⁸ whereas the latter tends to emphasize sovereignty, statehood, and balances of power.^{35,52}

In summary, the 'chorus of doom' that persistently echoes around the world of water politics, governance, and management finds little resonance among scholars of Southern Africa. The balance of this essay treats each of these categories in some depth, and critically reflects on the state of scholarship regarding conflict and cooperation over water resources in Southern Africa.

WATER AND CONFLICT

While conflict and violence come in many different shapes and sizes, and are usually easily recognizable, we tend to most commonly associate them with macro, intergroup events that are destabilizing to the social system, with the assumption being that they are bad and to be avoided at all costs: e.g., warfare, terrorism, civil war, and genocide. So, while the Merriam Webster dictionary defines 'conflict' (noun) as the 'competitive or opposing action of incompatibles, antagonistic state or action (as of divergent ideas, interests, or persons)', and 'conflict' (verb) as 'to be different, opposed, or contradictory: to fail to be in agreement or accord', each definition chooses to emphasize military conflict at the outset, i.e., 'fight, battle, war' (n.) or 'to contend in warfare' (v.). Similarly, violence (n.) is defined as 'exertion of physical force so as to injure or abuse (as in warfare ...)' (see www.merriam-webster.com).

However, there is a long history of the study of conflict and violence as normal and even essential social behaviors. Coser, for example, argued that 'conflict ... prevents the ossification of the social system by exerting pressure for innovation and creativity'.⁶⁹ He goes on to quote John Dewey's now well-known observation that 'Conflict is the gadfly of thought. It stirs us to observation and memory. It instigates to invention. It shocks us out of sheeplike passivity, and sets us at noting and contriving ... Conflict is a sine qua non of reflection and ingenuity'.⁶⁹

As concepts in the social sciences conflict and violence take on specific and often distinctive meanings. Part of the problem with the literature on conflict and natural resources is the predominant assumption that conflict (1) is to be avoided and (2) we know it when we see it. Few are the studies that endeavor to be as precise as Toset et al.⁷⁰ and Gleditsch et al.⁷¹ who define 'violent conflict', for example, as 'the onset of militarized disputes with at least one fatality'. Homer-Dixon,^{72–74} in his widely cited project on natural resources and conflict, focused on 'acute conflict', defined as conflict that has a 'substantial probability of violence'. The case studies in his project, including one on South Africa, revealed a wide variety of conflicts and various levels of violence. For example, Homer-Dixon and Percival⁷⁵ examined the relationship between resource scarcities and violence defined as total deaths and injuries over a particular time period (in this case, the late 1980s—early 1990s, arguably the most violent moment in the transition from apartheid to postapartheid).

The assumption here, and in almost all case studies, is that further conflict is to be avoided. In a recent study of the literature on climate change and

conflict, Hsiang et al.⁷⁶ grouped violence and conflict into three categories: (1) personal violence, (2) group violence, and (3) breakdown of social order and political institutions. In a wide ranging survey of the literature, they concentrated on 60 large-n, empirical studies, where the data was gathered in a variety of ways (e.g., content analysis of media). While perhaps imperfect in their methods, these studies nonetheless provide an important baseline for comparison and generalization and, in my view, point a useful way forward for future research regarding conflict and cooperation over water resources in Southern Africa. As shown below, there is little systematic, sustained or critical and reflective research into these topics, to the contrary, most of it is policy-oriented and proceeds under the assumption that ‘cooperation is good, conflict is bad’—indeed, the term ‘conflict’ is officially not to be used in any SADC materials! (personal communication, SADC official, October 6, 2014)

A HISTORY OF VIOLENCE

Southern Africa, like any world region, is replete with a history of violent struggle for group-based social ends: from colonial and imperial land and resource grabbing projects to the creation of particular social forms based on exclusivist ideologies such as white racial superiority, anticommunism, socialism, and ethnicity/tribalism to name several.^{77–80} Several of these conflicts are ongoing (e.g., in the Democratic Republic of Congo), or recently revived (e.g., in Mozambique between former combatants FRELIMO and RENAMO), and several other states teeter on the brink of collapse (e.g., Swaziland and Zimbabwe).^{81–84} This instability has resulted in neighboring states playing host to large numbers of refugees (e.g., in Malawi, Zambia, and Tanzania) and economic migrants (e.g., in South Africa). Most notably, perhaps, South Africa transitioned peacefully to a postapartheid, nonracially segregated democracy in the early 1990s after a decade of violent conflict with several of its neighboring states and a great deal of highly organized civil unrest. Many longtime observers of the region anticipated a descent into civil war, which failed to materialize, so leading to the popular claim that South Africa’s transition was ‘a miracle’.^{85,86} This transition was preceded by the end to the revolutionary struggle in Namibia, which led to a peaceful, single party-dominant, nonracial democracy, and was followed by the end of a multidecadal civil war in Angola. In each of these cases, apartheid South Africa played a significant role as a military antagonist standing in the way of majority rule (in Namibia) and peace (in Angola).^{87–89}

What is all the conflict about? Across the region, the primary conflict drivers have been land and resources. Given the region’s history of colonialism, the struggle for land and resources is inevitably linked to issues of identity, race, ethnicity, and so on.^{90–96} The wealth deriving from these resources is significant but poorly distributed. SADC is characterized by several states (e.g., Botswana, Namibia, South Africa, and Zimbabwe) whose Gini coefficients of income inequality are among the highest in the world, and several others whose HDI values are among the lowest in the world (e.g., DRC, Malawi, Mozambique, Tanzania, Zambia, and Zimbabwe), so wealth is badly skewed toward elites within and across SADC states. Among SADC states, South Africa remains predominant in every category measuring state power, despite being relatively poorly endowed with freshwater resources in comparison to most of its fellow SADC member states.⁹⁷

To many scholars, these factors taken together are a recipe for violent conflict: a history of intrastate and interstate violence, a dominant state in need of water for development, limited human, financial, and other key resource capacities so limiting adaptive capacity (often described as ‘second order water scarcity’,^{98,99}) poor states with (relatively or absolutely) authoritarian elites presiding over weak civil societies and poor populations, difficult and sometimes unpredictable hydrological regimes, and many shared rivers.¹

THE PRESENCE OF COOPERATION

Southern Africa’s states share 15 river basins, of which six were once identified to be ‘at risk’ by Aaron Wolf and his colleagues in Oregon—the Cunene, Inkomati, Limpopo, Orange-Senqu, Okavango, and Zambezi¹⁰⁰—who argued in 2003 that these basins were likely to see ‘an escalation of conflict’ in the next 5 to 10 years. However, in a recent update (Ref 6, p. 883), Wolf and colleagues state: ‘Among those basins flagged as “at risk” ... only the Ganges-Brahmaputra and Mekong have recorded a significant number of events between 2000 and 2008 and cooperation has outweighed conflict in both basins. This confirms the idea that “basins at risk” is a fluid concept, with the actual basins changing constantly’.

So much of the research on water resources in Southern Africa takes its cues from trends in the global North. Post-Cold War narratives of ‘the coming anarchy’ across the global South, said to be driven by populations spiraling out of control, renewable resources being degraded, and runaway poverty rates, led to several large-scale research programs

investigating the relationship between resources and violent conflict.^{101,102} Several Southern, Central, and Eastern African countries featured as case studies in these projects.^{74,103,104} In the mid-1990s, the World Bank turned its attention to freshwater resources, arguing that the wars of the future would be about water. This was echoed by many others.¹⁰⁵ Several river basins in the SADC region were identified as ‘global hotspots’, with the Zambezi being *primus inter pares*. It was also about this time that South Africa rejoined the global community, and South African scholars and policy makers wishing to be good global citizens, took to the task of following current global trends with some relish.

Among many other research streams, ‘natural resources, the environment and violent conflict’ and the ‘water wars hypothesis’ were investigated, only to reveal a good deal of cooperation—within and across states—where conflict might have been expected.^{22,51} Beginning in the latter half of the 1990s, numerous studies emerged from small presses and in various university or research institute working paper and other publication series, primarily out of South Africa and to a lesser extent Zimbabwe, articulating the facts of regional cooperation.

In some ways, the region was ahead of the global curve in contesting ‘the water wars’ and ‘resource wars’ hypotheses.^{54,106–108} In the words of South Africa’s former Minister of Water Affairs and Forestry, Kader Asmal, ‘water is a catalyst for peace’.¹⁰⁹ As global trends in policy-oriented research pressed for better management through IWRM and governance of water resources, the SADC came to feature as a case of global ‘best regional/transboundary practice’.^{48,58,110–112}

Explanations for regional cooperation are several. Turton et al.⁶¹ interestingly argue that scarcity is an inducement to cooperation, not conflict, particularly where a dominant or, in their terms, ‘pivotal’ or ‘hydrohegemonic’ basin state is involved: ‘Because of the existence of water scarcity constraints to future economic development within basin hegemonic states, this might be sufficient inducement to seek future cooperative solutions’.⁶¹ Turton and Funke⁶⁰ apply the general principle to a case study of the Orange-Senqu river basin, arguing that South Africa’s ‘hydrohegemony’ enables cooperative outcomes. This does not mean that cooperation is everywhere and always good. The authors make the central point that cooperation among asymmetrical states (i.e., where South Africa is overwhelmingly the economic and military power in relation to Lesotho, Namibia, and Botswana) can lead to durable outcomes that are sub-optimal in the eyes of the weaker states. This finding

contrasts with Waterbury’s¹¹³ observation that where resource interdependence is present, the likelihood of ‘asymmetric gains’ will act as a barrier to cooperation. In the case of the Orange-Senqu, however, it is clear that ‘benefit sharing’ can be realized—despite asymmetrical gains—if the need of the hydrohegemonic state is significant,^{60,114} so confirming Delbourg and Strobl’s¹¹⁵ observation that cooperation in country dyads is more likely when the upstream riparian receives a shock. In this case, cooperation quickly followed a coup d’état.^{60,116,117} Moreover, for Turton and Funke,⁶⁰ South Africa’s chosen role as a ‘positive-sum outcome’ hydro-hegemon is commensurate with findings by Gleditsch et al.⁷¹ that states with endemic water scarcity have a vested interest in finding cooperative solutions that minimize the potential for future conflict.

Moving from potential conflict to cooperation potential (to quote UNESCO PC-CP program material, see www.unesco.org/water/wwap/pccp/) requires the identification of ‘benefits’ to be shared by parties in dispute. Following on important work by Sadoff and Grey,^{118,119} Southern Africa became an incubator for studies of benefit sharing.^{58,120–129}

Swatuk^{48,130} argues that regional cooperation is partly due to a combination of factors relating to SADC state elites: having shared in the liberation struggle against colonialism and apartheid, these leaders drive coordination of regional affairs from the top and are reluctant to criticize each other’s behavior as leaders of their respective states. At the same time, they share a high-modern perspective on water’s role in national development that is typical of (men) of their generation: i.e., the control of nature for human-determined ends, so pipelines, dams, power-grids, and so on form the basis for SADC state-based regional cooperation.¹³¹

A third explanation for the overriding dominance of regional cooperation is the impact of international actors. Chenje¹³ and Chenje and Johnson^{12,132} describe the myriad ways in which multilateral, international, and nongovernmental organizations are involved in water resources development and management within and across SADC states. Jonker et al.¹³³ describe the central contribution of SADC member states, national institutions and organizations, and international partners to water research and education in the Southern African region. Unlike other world regions, Southern Africa has long been recognized, in the words of Larry Bowman,¹³⁴ as a ‘penetrated political system’. A brief survey of research projects being undertaken across the region quickly reveals the extent to which SADC states are influenced by the finance and thinking of

scholars and policy makers across the world, in particular European donor states, tertiary institutions, international organizations, and so on. Keck and Sikkink¹³⁵ describe these types of actors as ‘norm entrepreneurs’, underscoring the influence of external actors in fostering intra- and inter-SADC state cooperative action on water resources development and management.^b

In a comparative study of three regions (Middle East, South Asia, and Southern Africa) with a focus on one country (Israel, India, and South Africa) Giordano et al.¹³⁶ compiled and analyzed two events datasets, one covering international water relations (1948–1999), and one covering domestic water relations (1989–2000). Events were catalogued according to the well-known water-related Friendship-Hostility Index (FHI) that ranges between –7 (formal declaration of war) and +7 (voluntary unification into one nation). Aside from a general conclusion that showed that national water relations are related to international water and nonwater relations, what is interesting for our purposes here is the finding that of 1831 events catalogued, 507 were conflictful, 1228 were cooperative, and 96 were neutral. Similarly, large-n studies of conflict and cooperation on shared water resources revealed the same sorts of data: the simultaneous presence of conflict and cooperation.^{70,71,100,136–139}

In a critical review of the literature on transboundary waters in Southern Africa, Furlong¹⁴⁰ demonstrated the contradictory nature of interstate cooperation whereby regional peace may in fact mask subnational forms of structural violence through, for example, alienation of land due to dam construction as is the case in the Lesotho Highlands Water Project (LHWP). Similarly, Cascao^{141,142} and Zeitoun¹⁴³ and colleagues^{144–148} show that cooperation sometimes equals domination. This finding of the simultaneous presence of cooperation and conflict, as well as the often suboptimal outcomes that result in the balance has been described in some detail by Swatuk in relation to the Okavango,^{149–151} the SADC region,^{12,152} and South Africa in particular,¹⁵³ and by Mokorosi and van der Zaag¹⁵⁴ in relation to dam development in the Orange-Senqu river basin. In a study of local level water institutions in Tanzania, Komakech, van der Zaag and van Koppen¹⁵⁵ show how asymmetry, inequality, and heterogeneity of actors actually facilitates coordination and collective action. Indeed, Mirumachi⁴ argues that the obsession with interstate cooperation is unfortunate as it obscures the ‘messiness’ of actually existing water politics.

Naho Mirumachi and her colleagues have developed the TWINS framework in order to begin to be

able to tease out these complex relations, primarily in terms of interstate relations on transboundary rivers. This important work helps explain not why cooperation predominates over conflict in the SADC region, but why, in particular cases, relations are on balance more or less conflictful or more or less cooperative and what these conditions mean for water resource access, use and management. Mirumachi, and van Wyk,¹²⁷ in their study of the Orange-Senqu river show the unevenness of shared benefits where riparian states are highly unequal. Kistin and Ashton’s work⁵⁷ on the same river system is important in illustrating the ‘dynamic’ nature of relations among riparian states, warning that formal agreements are no guarantee of mutually beneficial outcomes to the satisfaction of all stakeholders in a basin. Ohlsson and Turton⁹⁸ describe the multi-level stressors (local, national, and regional/transboundary) facing water resource managers, arguing that unequal access founded on poor systems of delivery is a consequence of ‘second-order scarcity’, meaning that they result not from absolute scarcity of water but of manufactured scarcities due to the structure of the social system.^{156–158} Similar to Homer-Dixon’s general findings,⁷⁴ the authors argue that, among other things, adaptive capacity must be developed for conflict to be avoided. This stands in contrast to Swatuk’s observation that the wealthy always have water,^{50,130} so while ‘second-order scarcity’ as a concept is useful in moving the analysis beyond the resource scarcity-social violence narrative, it nevertheless masks the real basis for ‘persistent, diffuse, subnational conflict’, i.e., resource capture by the few (following Homer-Dixon^{72–75}) and the subsequent and equally persistent allocation of resources by and for those actors who have captured the resource to the exclusion of others (following Mehta^{156,157}). I return to this conceptualization below.

WARNING SIGNS AND LESSONS LEARNED

With regard to actual cases of interstate conflict as chronicled in peer reviewed literature, there are only two such cases: the SADC-endorsed, South African Defense Force-led intervention in Lesotho in 1998, and the mobilization of troops along the Chobe River border between Namibia and Botswana who were contesting ownership of Sedudu/Kasikili island (Botswana call it Sedudu, Namibians Kasikili). In the case of the former, SADC took emergency action following a direct request to intervene from Lesotho’s Prime Minister, Pakilitha Mosisili, while the country was caught up in a military revolt.^{159–162} One of the first actions taken by the SADF was to ‘secure’

the Katse Dam—a key piece of hydraulic infrastructure ensuring water security not for Lesotho but for South Africa. Several Basotho military troops were killed during this action so leading to an outcry among scholars and critical observers regarding the heavy-handed tactics of postapartheid South Africa.¹⁶¹ Several studies characterize this military action as a ‘water war’, or a ‘resource war’, or an instance of ‘resource capture’.^{162,163} However, the evidence supporting this claim is conjectural and anecdotal. Richard F. Weisfelder,¹¹⁷ in contrast, argues that the intervention was misconstrued by some as a ‘water war’ and, while there were several initial missteps, ultimately the intervention was one element of many SADC interactions ‘vital in sustaining its democratic government and restoring political stability’. Nevertheless, the lesson to be learned, according to these scholars, is that South Africa will remain the dominant actor in the region for the foreseeable future.¹⁶⁴ It is interesting to note how this behavior and these interpretations have been pushed to the margins of the discourse on sharing water, as other frameworks such as ‘benefit sharing’ reveal the win-win outcomes of the LHWP in general.^{120,165}

In the Namibia-Botswana case, aside from the popular press in these two countries that were only too happy to point to ‘water wars’ in bold type across their newspapers, the general take on the conflict was and remains that the choice to submit the issue for adjudication to the International Court of Justice (ICJ) and abide by the recommendation once it was handed down was evidence of a nascent ‘regime’ in operation where conflict was a precursor to cooperation (to use classic international organization nomenclature).^{48,61,166}

In some ways then, and in line with Furlong’s review of the literature,¹⁴⁰ while these two cases of overt interstate conflict sit at polar extremes, they fit comfortably with the expectations of state-centric perspectives based on classic International Relations theories of realism (the unilateral pursuit of national interest based on power: the Lesotho case) and neoinstitutionalism (the collective resolution of disputes through established institutions where participants are respected as equals: the Namibia-Botswana case). The key point seems to be that with regard to transboundary resources, viable cooperative management options pass through the orthodox pathway of interstate diplomacy in pursuit of ‘national interest’.¹¹²

GETTING IT RIGHT BEFORE TIME RUNS OUT

Empirical studies indicate that climatological variables have a large effect on the risk of violence or instability

in the modern world ... Climatic anomalies of all temporal deviations, from the anomalous hour to the anomalous millennium have been implicated in some form of human conflict.⁷⁶

The fear of scarcity-driven conflict in SADC is pervasive in regional and international water resources scholarship, particularly that which is policy-oriented.^{1,167} The standard argument suggests that while cooperation predominates now, there is no guarantee that conflict will not arise in the near future particularly if current trends continue. With specific reference to water, by ‘trends’ what is usually meant is disintegrated management and poor governance. The emergent water-food-energy-climate nexus discourse places water at the center of sustainable futures, as water is the common variable across key issue areas. It argues that if we get water management right, we will solve a rather complex puzzle.¹⁶⁸ Avoiding conflict, then, requires *inter alia* bridging ingenuity gaps, building resilience, technical and human resource capacity building, collecting information and building a knowledge bank, enhancing trust, facilitating stakeholder participation, creating smart partnerships across state, civil society, and the private sector, or around a dialogue of state, science and society.^{37,169} There is a sense of urgency to all of this literature as well as an enduring lament at the durability of maladaptive systems, fostered in part by ‘a lack of political will’. Terminology such as ‘closed basins’ and ‘over-allocation’, commonly used to describe the Limpopo River basin,^{1,164,170} heighten the sense of tension regarding time frames for informed decision making. The climate change and conflict discourse has given renewed urgency to these tasks, and you can find the hypothesized negative consequences of being ill-prepared for climate change scattered across recent literature. In most cases, the argument is put forward that ‘climate change is a threat multiplier’.³⁵ But, again, it must be pointed out that the empirical evidence is weak and the ‘coming anarchy’ is a product largely of fantasy. Rather than the predicted ‘escalation of conflict’, evidence shows that things look pretty much the same in these and all other SADC state river basins.^{171,172} For Gleditsch, ‘it seems fair to say that so far there is not yet much evidence for climate change as an important driver of conflict’.¹⁷³

WHAT IS MISSING FROM THIS PICTURE?

All of this attention paid to the potential for violent conflict at a macro scale, be it interstate or intrastate, and what states and their various partners must do to avoid it, sits uncomfortably apart from the facts of

conflicts within states that Homer-Dixon accurately defined as subnational, persistent, and diffuse.⁷⁴ These are small-scale conflicts among stakeholders in rural areas,^{174,175} and across the urban/peri-urban milieu as they relate to the perceived failure of the state to provide access to potable water and sanitation.^{66,108,111,176,177} As Funder et al. correctly state, '[W]hile transboundary water conflict and cooperation has been subject to increasing attention in recent years ... less is known about the nature of local water conflict and cooperation, especially in terms of quantitative systematic analysis of the characteristics of such events'.¹⁷⁴ While quantitative systematic analysis is still lacking, there is a great deal of critical scholarship focusing on these issues from a case study perspective wherein questions regarding peace and conflict are set not within the context of scarcity, but within the interrelated contexts of access and equity, or, put differently, 'manufactured scarcity'.^{157,158} Articulated by Homer-Dixon as problems of resource capture and environmental marginalization, the resulting violence is often anomic, unorganized and spontaneous.⁷²

With regard to water conflicts in urban settings, virtually the entirety of scholarship emanates from South Africa.^{62,66,67,178–181} Elsewhere in the SADC region, conflict is often mentioned as a byproduct of poor governance and management as it manifests in inadequate service delivery, moves toward privatization (through water kiosks, for example), and full-cost recovery.¹⁸² It is interesting to note that in the postapartheid setting, a new Water Services Act was passed before a new Water Act. This was due to the pressing need to provide water to the millions of newly enfranchised South Africans who were deliberately unserved or underserved under apartheid. While urban water provision for personal, household, and small-scale economic needs is, in Tony Allan's terms, 'small water', in postapartheid South Africa it is very big politics. The bulk of these studies locate conflict causality within highly stratified class systems.^{183–185} So, the recipe for resolving social conflict related to access to water is, in fact, more effective conflict through enhanced organizational capacity of social movements and civil society organizations.^{186,187} The energy surrounding anomic, sporadic, and chaotic violence, therefore, according to scholars of the left, should be captured and channeled through (1) unifying concepts regarding what exactly social movements are fighting for and (2) shared strategies across organizations at all levels (from community to transnational).^{188–190}

Recently, questions have arisen regarding both the validity and utility of the Constitutional courts

of South Africa as sites for pressing government to deliver services and resources as per the Constitution itself. Just as 'Cochabamba' serves as shorthand for state-civil society 'wars' over water, so too does 'Marikana'—the infamous mineworker massacre—serve as shorthand for the extremely poor condition of state-civil society relations in postapartheid South Africa today.^{68,191,192} So, Cape Town's 'toilet wars', join a long line of public protests as they relate not only to services but to citizenship.⁶⁸ Put slightly differently, water scarcity for the many and water plenty for the few is manufactured through social relations of production; lack of water, therefore, is a symbol of an unequal society irrespective of South Africa's freshwater resources endowment. Fiddling with governance or management may help somewhat, but the source of water poverty is deeply embedded in terms of class, race, gender among other things.^{193–197} In terms of conflict, then, the implication here is that without thorough-going alterations to social structure, current forms, and levels of violence are but the tip of the iceberg.

In terms of rural water, and as shown in a recent study by Funder et al.,¹⁷⁴ which focuses on Namwala District in southern Zambia, water conflicts in these areas are most often highly localized and revolve around 'everyday life'.^{198,199} Funder et al.'s study is, to my knowledge, the only study to attempt to quantify conflict and cooperation over water resources in the SADC region. Canvassing 10 villages, the authors catalogued water-related conflict and cooperation in terms of 'public events', defined as 'an action (or a set of actions) that seeks to secure one or more parties' access to water by: (1) challenging other parties' access, (2) confirming own or other parties' access, or (3) collaborating with other parties to secure access' (Ref 174, p. 2). A total of 183 specific events were identified, 66.1% being conflictful, and 33.9% being cooperative. According to Thomasson²⁰⁰ and Wolfe et al.,² local conflicts within nations—i.e., 'between tribes, water use sectors, rural and urban populations, and states or provinces'²—are on the rise. Funder et al. show that 74% of conflictful events are water infrastructure-centered (of which 45% relate specifically to boreholes), and 82% of these events occur in the dry season (so are mainly about quantity).¹⁷⁴ This corroborates research conducted in other parts of sub-Saharan Africa which shows that, in terms of extreme events, while both drought and flood create serious tensions within and between states, drought leads most often to conflict whereas flood often leads toward cooperation.^{201,202}

While highly localized rural water conflicts are generally resolved due to a combination of

mutual need and shared vulnerability, as the geographic scale and variety of stakeholders increases, conflicts become more deeply entrenched and tangled up with broader social issues of power and politics.^{203–205} Upstream–downstream conflicts over, *inter alia*, access, quantity, and quality involving smallholder farmers, large-scale commercial agriculture, hydropower generation for cities, parks and protected areas, and mining companies are common in virtually every SADC state river basin.^{46,150,175,206–208} Van Koppen *et al.*²⁰⁹ show how new water laws designed to facilitate improved water management and governance actually privilege a particular social class and often serve as the basis for peasants' loss of access to traditional sources of water.^{210,211} Narratives built around 'national development' further justify the appropriation of water resources by powerful coalitions of stakeholders.²⁰⁶ Meissner describes the plight of the Himba in northern Namibia in their ongoing struggle with the government of Namibia over the proposed Epupa Dam, now moth-balled due to a combination of local and global pressure.^{212,213} Kgomotso and Swatuk describe the process of resource capture and ecological marginalization around the Okavango Delta in northern Botswana.¹⁵¹ Cullis and van Koppen document how closely a Gini coefficient of water inequality mirrors income inequality in South Africa for the Olifants river basin.²¹⁴ These conflicts are persistent, tending to flare up in the dry season, often requiring government to come in as a 'mediator', which is problematic given that government is also a user, as in the case of the proposed Epupa dam. What all of these studies reveal is the important role played by outside actors, such as the International Rivers Network in both the Namibia and Botswana cases, in balancing power between conflicting parties.

Unlike the critical sociological studies of urban water conflicts, the majority of studies of rural water conflicts invariably argue for improved forms of management and governance as a viable means for conflict resolution and win-win outcomes: *e.g.*, more representative management structures, embedded forms of stakeholder participation, formal systems of dispute resolution, often with an emphasis on the need to embed local tradition, custom, and indigenous knowledge in the resulting organizational forms.^{126,178,215–219} In these cases, conflict is often explained as the inevitable consequence of the clash of the traditional with the modern, or of limited understanding. Compiling more and better information, and getting the institutions right, it is often suggested, will help resolve these conflicts.

More recently, a significant body of research has emerged around the so-called 'land-grabbing'

phenomenon particularly as it relates to sub-Saharan Africa.^{220–222,125,223–226} Evidence here suggests that something more is needed beyond institutional reform.^{50,62,130} Work by Cotula, Vermeulen, and others shows that technically these deals are legal, but that they suffer from a lack of transparency, limited involvement from civil society, and few checks and balances on decision makers.^{220,223,224} While it is the large-scale single acquisitions that gain attention, the literature suggests that the phenomenon is widespread, fostered in part by the weakness of rural people's rights to land.²²⁴ The influence of outside actors to mediate resource access disputes is limited, however, when the state takes upon itself the legal right to lease land to major powers such as China and Korea, or to undertake large-scale infrastructure projects that displace local people from communal lands. While there is no evidence to suggest that this phenomenon will lead to widespread violent conflict, it is clear that such actions place enhanced pressure on those least equipped to survive.

CONCLUSION: WHERE DO WE GO FROM HERE?

The first wave—'neo-Malthusian water wars'—revealed a good deal of cooperation across the global freshwater landscape, while fuelling countless national, regional and global projects, and programs for improved governance and management. The second wave—'climate wars'—is currently reshaping management responses through a language of 'adaptation', 'resilience', and integration through a 'nexus' approach. Each of these approaches privileges the state as the primary entity in ensuring national and regional water peace and security.

Flying under the radar of these studies, are the facts of subnational, persistent, and diffuse conflicts across Southern Africa's cities and rural areas, as well as the state's complicity in fostering household and community livelihood insecurity. Where they do intersect with the orthodox approaches to water conflict, they are often explained as national problems relating to poor governance, disintegrated management, and lack of political will. Put differently, these conflicts are intellectually contained by what Furlong calls the territorial trap. Critical scholarship, on the other hand, would argue that these are not discrete events reflecting individual state-civil society relations, but are indicative of a global phenomenon of 'water apartheid' (to paraphrase Fantu Cheru), largely resulting from pressures due to neoliberal globalization. They add up to what Vandana Shiva describes as a 'water war' of the rich against the poor.²²⁷

Whether one agrees with this analysis or not, it is clear that those interested in water and conflict—globally or regionally—must find a way to integrate the continuing fascination with the potential for interstate conflict on transboundary waters (and possibly aquifers)—which shows rather a great deal of both conflict and cooperation—with the real-time, numerous, and persistent conflicts that exist within states across entire world regions.

In my view, initiating a ‘third wave’ of more nuanced and sophisticated studies of water cooperation and conflict in Southern Africa involves at least four steps. First, following from Mirumachi, and her colleagues,^{144–146} scholars and policymakers must dispense with the notion that either conflict or cooperation constitutes an absolute condition of relations between and among states, as well as within states and other social forms (villages, communities, and so on). To the contrary, conflict and cooperation are generally simultaneously to be found. Second, following on from critical sociological conceptualizations of peace and conflict, scholars must begin to examine the specific shape and content of these conditions. Put differently, the presence of cooperation among some actors may connote a wide variety of things: a dominate–subordinate relationship that is unacceptable but unavoidable for the weaker actor, a mutually beneficial relationship among empowered actors that masks the negative impacts that such cooperation has on other groups across the social spectrum, a mutually beneficial relationship built around an environmentally unsustainable practice, to cite but three possibilities. Not all peaceful relations are ‘good’, neither are all conflictful relations ‘bad’. Third, following on from

Funder et al.,¹⁷⁴ scholars must approach the topic in a more systematic fashion, involving the gathering of empirically robust and verifiable data. Too much of the current scholarship relies on anecdotal evidence, narrow case studies, or is highly speculative. Unfortunately, the ‘climate change’ narrative encourages such speculation. While this analysis is informed by ‘expert opinion’,¹⁶⁸ there is no substitute for systematic data collection and analysis. At minimum, such data collection will constitute a baseline for argument and discussion. Fourth, and lastly, it seems to me that scholars interested in questions of water conflict and cooperation should read beyond their respective disciplines, in other languages if possible. Feeling intellectual discomfort may be the necessary first step toward deep insight, perhaps even wisdom.

NOTES

^a The Southern African Development Coordination Committee (SADCC) was created by nine member states in the late-1970s, all of which were opposed to apartheid and colonial power in the region.⁹ Anticipating the end of apartheid, SADCC became the Southern African Development Community (SADC) in 1994, welcoming South Africa as a member. Today SADC comprises 15 states: Angola, Botswana, Democratic Republic of the Congo, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia, and Zimbabwe.

^b One can very clearly see the breadth of international influence from the list of publishers in the appended bibliography.

REFERENCES

1. Ashton PJ. Southern African water conflicts: are they inevitable or preventable?. In: Solomon H, Turton AR, eds. *Water Wars: Enduring Myth or Impending Reality?* African Dialogue Mongraph Series, vol. 2. Durban: ACCORD; 2000.
2. Wolf AT, Kramer A, Carius A, Dabelko GD. *Managing Water Conflict and Cooperation*, in *Worldwatch Institute, State of the World 2005: Global Security*. London: Earthscan; 2005.
3. Bernauer T, Bohmelt T, Koubi V. Environmental changes and violent conflict. *Environ Res Lett* 2012, 7:1.
4. Mirumachi N. *Transboundary Water Politics in the Developing World*. London: Routledge; In press.
5. Wolf A. Cooperation and conflict along international waterways. *Water Policy* 1998, 1:251–265.
6. De Stefano L, Edwards P, de Silva L, Wolf AT. Tracking cooperation and conflict in international basins: historic and recent trends. *Water Policy* 2010, 12:871–884.
7. Gleick P. Water and conflict, fresh water resources and international security. *Int Security* 1993, 18:79–112.
8. Savenije HHG. Water scarcity indicators; the deception of the numbers. *Phys Chem Earth* 2000, 25:199–204.
9. Weisfelder R. The Southern African development coordination conference: a new factor in the liberation process. In: Callaghy T, ed. *South Africa in Southern Africa*. New York: Praeger; 1983.
10. Pietersen K, Beekman HE, Holland M, Adams S. Groundwater governance in South Africa: a status assessment. *Water SA* 2012, 38:453–460.

11. Turton AR, Patrick M, Cobbing J, Julien F. *The Challenges of Groundwater in Southern Africa. Navigating Peace 2*. Washington, DC: The Woodrow Wilson International Center for Scholars; 2006, 1–6.
12. Chenje M, Johnson P, eds. *Water in Southern Africa*. Harare/Maseru: SARDC/SADC; 1996.
13. Chenje M, ed. *State of the Environment in the Zambezi Basin 2000*. Maseru/Lusaka/Harare: SADC/IUCN/ZRA/SARDC; 2000.
14. Heyns P. Water resources management in Southern Africa. In: Nakayama M, ed. *International Waters in Southern Africa*. Tokyo: United Nations University; 2003.
15. Falkenmark M. The massive water scarcity now threatening africa – why isn't it being addressed? *Ambio* 1989, 18:112–118.
16. Gleick PH, ed. *Water in Crisis: A Guide to the World's Fresh Water Resources*. Oxford: Oxford University Press; 1993.
17. Lundqvist J. Averting looming hydrocide. *Ambio* 1998, 27:428–433.
18. Ohlsson L. *Water and Security in Southern Africa*. Stockholm: SIDA; 1995.
19. Ohlsson L. Water scarcity and conflict. In: Spillmann KR, Krause J, eds. *International Security Challenges in a Changing World*. Bern: Peter Lang; 1999, 211–234.
20. Postel S. Dividing the waters: food security, ecosystem health, and the new politics of scarcity. Worldwatch Paper 132. Washington, DC: Worldwatch Institute; 1996.
21. Postel S. *The Last Oasis: Facing Water Scarcity*. London: W.W. Norton and Co.; 1994.
22. Solomon H, ed. *Sink or Swim? Water, Resource Security and State Cooperation*. ISS Monograph Series, vol. 6. Pretoria: Institute for Security Studies; 1996.
23. Van Wyk J-A. Towards water security in Southern Africa. *Afr Secur Rev* 1998, 7:2. Available at: <http://www.issafrica.org/pubs/ASR/7No2/VanWyk.html>.
24. Fig D. Environmental flashpoints in South Africa. *Track Two* 1996, 5:4–6.
25. Tevera D, Moyo JS. *Environmental Security in Southern Africa*. Harare: SARIPS/SAPES Trust; 2000.
26. Blanchon, D.. La politique de l'eau en Afrique du Sud: le difficile équilibre entre développement durable et valorisation optimale de la ressource. *Developpement durables et territoires*, Dossier 6, Les territoires de l'eau; 2006, 1–13.
27. Blanchon D. Les nouveaux enjeux géopolitiques de l'eau en Afrique austral. *Hérodote* 2001, 102:113–137.
28. Adano W, Dietz T, Witsenburg K, Zaal F. Climate change, violent conflict and local institutions in Kenya's drylands'. *J Peace Res* 2012, 49:65.
29. Bernauer T, Siegfried T. Climate change and international water conflict in Central Asia. *J Peace Res* 2012, 49:227–239.
30. Devitt C, Richard SJ. Civil war, climate change and development: a scenario study for sub-Saharan Africa. *J Peace Res* 2012, 49:129.
31. Wit D, Marten JS. Changes in surface water supply across Africa with predicted climate change. *Science* 2006, 311:1917–1921.
32. Gemenne F, Jon B, Adger WN, Dabelko GD. Climate and security: evidence, emerging risks, and a new agenda. *Clim Change* 2014, 123:1–9. doi:10.1007/s10584-014-1074-7.
33. Government of South Africa. *National Climate Change Response White Paper*. Pretoria: Department of Environmental Affairs; 2011.
34. SADC (Southern African Development Community). *Climate Change Adaptation in SADC: A Strategy for the Water Sector*. Gaborone: SADC; 2011.
35. Swain A, Swain R, Themner A, Krampe F. *Climate Change and the Risk of Violent Conflicts in Southern Africa*. Pretoria: Global Crisis Solutions; 2011.
36. Schnellhuber J, Schubert R, Buchmann N. *Climate Change as a Security Risk*. London: Earthscan for the German Advisory Council on Global Change; 2007.
37. Turton AR, Earle A, Malzbender D, Ashton PJ. Hydropolitical vulnerability and resilience along African international waters. In: Wolf AT, ed. *Hydropolitical Vulnerability and Resilience along International Waters: Africa*. Nairobi: UNEP; 2005.
38. Turton AR, Ashton PJ, Cloete TE, eds. *Transboundary Rivers, Sovereignty and Development: Hydropolitical Drivers in the Okavango River Basin*. Pretoria/Geneva: AWIRU/Green Cross International; 2003.
39. Ashton PJ. Avoiding conflicts over Africa's water resources. *Ambio* 2002, 31:236–242.
40. Ashton PJ, Hardwick D, Breen CM. Changes in water availability and demand within South Africa's shared river basins as determinants of regional social and ecological resilience. In: Burns M, Weaver AVB, eds. *Sustainability Science*. Stellenbosch: SUN Press; 2008, 279–310.
41. Carmo Vaz A, Lopes Pereira A. The Incomati and Limpopo International River Basins: a view from downstream. *Water Policy* 2000, 2:99–112.
42. Mbaiwa JE. Causes and possible solutions to water resource conflicts in the Okavango Basin: the case of Angola, Namibia and Botswana. *Phys Chem Earth* 2004, 29:1319–1326.
43. Magole L. The feasibility of implementing an integrated management plan of the Okavango Delta, Botswana. *Phys Chem Earth* 2008, 33:906–912.
44. Manning N, Seely M. Forum for integrated resource management (FIRM) in Ephemeral basins: putting communities at the centre of the basin management process. *Phys Chem Earth* 2005, 30:886–893.

45. Turton AR. An overview of the hydropolitical dynamics of the Orange River basin. In: Nakayama M, ed. *International Waters in Southern Africa*. Tokyo: UNU; 2003, 136–163.
46. Ashton PJ, Turton AR. Water and security in sub-Saharan Africa: emerging concepts and their implications for effective water resource management in the southern African region. In: Brauch H-G, Grin J, Mesjasz C, Drummenacher J, Behera NC, Chourou B, Spring UO, Liotta PH, Kameri-Mbote P, eds. *Facing Global Environmental Change: Environmental, Human, Energy, Food, Health and Water Security Concepts*, vol. IV. Berlin: Springer-Verlag; 2008, 665–678.
47. Swatuk LA. Power and water: the coming order in southern Africa. In: Hettne B, Inotai A, Sunkel O, eds. *The New Regionalism and the Future of Security and Development*. Basingstoke: Macmillan; 2000, 210–247.
48. Swatuk LA. The new water architecture in southern Africa: reflections on current trends in the light of “Rio +10”. *Int Aff* 2002, 78:507–530.
49. Swatuk LA. Environmental cooperation for regional peace and security in Southern Africa. In: Conca K, Dabelko GD, eds. *Environmental Peacemaking*. Washington, DC: Johns Hopkins University Press; 2002, 120–160.
50. Swatuk LA. Political challenges to implementing IWRM in Southern Africa. *Phys Chem Earth* 2005, 11:872–880.
51. Solomon H, Turton AR. *Water Wars: Enduring Myth or Impending Reality?* African Dialogue Monograph Series, vol. 2. Midrand: ACCORD; 2000.
52. Turton AR, Ashton PJ. Basin closure and issues of scale: the Southern African hydropolitical complex. *Int J Water Resour Dev* 2007, 24:305–318.
53. Turton AR. Water wars in Southern Africa: challenging conventional wisdom. In: Solomon H, Turton AR, eds. *Water Wars: Enduring Myth or Impending Reality*. African Dialogue Monograph Series, vol. 2. Durban: ACCORD; 2000.
54. Turton AR. Water and state sovereignty: the hydropolitical challenges for states in arid regions. In: Wolf A, ed. *Conflict Prevention and Resolution in Water Systems*. Cheltenham: Edward Elgar; 2002, 516–533.
55. Earle A, Jagerskog A, Ojendal J, eds. *Transboundary Water Management: Principles and Practice*. London: Earthscan; 2010.
56. Thamae ML, Pottinger L. *On the Wrong Side of Development: Lessons Learned from the Lesotho Highlands Water Project*. Maseru: Transformation Resource Centre; 2006.
57. Kistin E, Ashton PJ. Adapting to change in transboundary rivers: an analysis of treaty flexibility on the Orange-Senqu River basin. *Int J Water Resour Dev* 2008, 24:385–400.
58. Phillips DJH, Daoudy M, Ojendal J, Turton A, McCaffrey S. *Transboundary Water Cooperation as a Tool for Conflict Prevention and for Broader Benefit-Sharing*. Stockholm: Ministry for Foreign Affairs; 2006.
59. Swatuk LA, van der Zaag P. River basin security: theory and practice in the Save and Pungwe river basins of Zimbabwe and Mozambique. *Georgetown Int Environ Law Rev* 2008, 21:705–731.
60. Turton AR, Funke N. Hydro-hegemony in the context of the Orange River Basin. *Water Policy* 2008, 10:51–69.
61. Turton AR, Patrick MJ, Julien F. Transboundary water resources in southern Africa: conflict or cooperation? *Development* 2006, 49:22–31.
62. Bond P. *Unsustainable South Africa*. Pietermaritzburg: UKZN Press; 2002.
63. Bond P. The case of Johannesburg water: what really happened at the pre-paid “Parish Pump”. *Law Dem Dev* 2008, 12:1–28.
64. Bond P. Water rights, commons and advocacy narratives. *South Afr J Hum Rights* 2013, 29:126–144.
65. Turton AR. The southern African hydropolitical complex. In: Biswas AK, Varis O, Tortajada C, eds. *Management of Transboundary Rivers and Lakes*. Berlin: Springer-Verlag; 2008, 21–50.
66. McDonald D, Ruiters G, eds. *The Age of Commodity: Water Privatization in Southern Africa*. London: Earthscan; 2005.
67. Thompson L, Tapscott C. *Introduction: Mobilisation and Social Movements in the South-the Challenges of Inclusive Governance*. *Citizens and Social Movements: Perspectives from the Global South*. London: Zed; 2010.
68. Ruiters G. Reclaiming the city: recent developments in trade union – community alliances and citizenship in post-alliance South Africa, 2010–2014. *Politikon* in press.
69. Coser LA. Social conflict and the theory of social change. *Br J Sociol* 1957, 8:197–207.
70. Toset HPW, Gleditsch NP, Hegre H. Shared rivers and interstate conflict. *Polit Geogr* 2000, 19:971–996.
71. Gleditsch NP, Furlong H, Hegre H, Lacina B, Owen T. Conflicts over shared rivers: resource scarcity or fuzzy boundaries? *Polit Geogr* 2006, 25:361–382.
72. Homer-Dixon TF. On the threshold: environmental changes as causes of acute conflict. *Int Secur* 1991, 16:76–116.
73. Homer-Dixon TF. Environmental scarcities and violent conflict: evidence from cases. *Int Secur* 1994, 19:5–40.
74. Homer-Dixon T. *The Environment, Scarcity and Violence*. Princeton, NJ: Princeton University Press; 1999.
75. Percival V, Homer-Dixon T. Environmental scarcity and violent conflict: the case of South Africa. *J Peace Res* 1998, 35:279–298.

76. Hsiang SM, Burke M, Miguel E. Quantifying the influence of climate on human conflict. *Science* 2013, 341:1–14.
77. Denoon D, Nyeko B. *Southern African Since 1800*. London: Longman; 1972.
78. Hanlon J. *Beggar Your Neighbours: Apartheid Power in Southern Africa*. London: James Currey; 1986.
79. O'Meara D. *Forty Lost Years: The Apartheid State and The Politics of the National Party, 1948–1994*. Johannesburg: Ravan; 1996.
80. Saul JS. *Recolonisation and Resistance in Southern Africa in the 1990s*. Toronto: Between the Lines; 1993.
81. Williams C. Explaining the Great War in Africa: how conflict in the Congo became a continental crisis. *Fletcher Forum World Aff* 2013, 37:81–100.
82. Moore D. Neoliberal globalization and the triple crisis of 'modernisation' in Africa, Zimbabwe, the Democratic Republic of the Congo and South Africa. *Third World Q* 2001, 22:909–929.
83. Vandome C, Vines A, Weimer M. *Swaziland: Southern Africa's Forgotten Crisis*. London: Chatham House; 2013.
84. Hanlon J. *Mozambique: The Revolution Under Fire*. London: Zed Books; 1984.
85. Guelke A. Dissecting the South African miracle: African parallels. *Nationalism Ethn Polit* 1996, 2:141–154.
86. Klug H. Constitution-making, democracy and the 'civilizing' of irreconcilable conflict: what might we learn from the South African miracle? *Wisconsin Int Law J* 2007, 25:269–299.
87. Leys C, Saul JS. *Namibia's Liberation Struggle: The Two-Edged Sword*. London: James Currey; 1995.
88. Malaquias A. *Rebels and Robbers: Violence in Post-Colonial Angola*. Uppsala: Nordic Africa Institute; 2007.
89. Cawthra G. *Brutal Force: The Apartheid War Machine*. London: IDAFSA; 1986.
90. Klare M. *Resource Wars: The New Landscape of Global Conflict*. New York: Henry Holt and Co.; 2001.
91. Collier P. The political economy of natural resources. *Soc Res* 2010, 77:1105–1132.
92. Collier P, Hoeffler A. On the economic causes of Civil War. *Oxf Econ Pap* 1998, 50:563–573.
93. Collier P, Hoeffler A. On the incidence of civil war in Africa. *J Confl Resolut* 2002, 46:13–28.
94. Collier P, Hoeffler A. Greed and grievance in civil war. *Oxf Econ Pap* 2004, 56:663–695.
95. Collier P, Hoeffler A, Rohner D. Beyond greed and grievance: feasibility and civil war. *Oxf Econ Pap* 2009, 61:1–27.
96. Le Billon P. Angola's political economy of war: the role of oil and diamonds, 1975–2000. *Afr Aff* 2001, 100:55–80.
97. Pressend M, Otieno T. *Rethinking Natural Resources in Southern Africa*. Midrand: Institute for Global Dialogue; 2009.
98. Ohlsson L, Turton AR. The turning of a screw: social resource scarcity as a bottle-neck in adaptation to water scarcity. SOAS Occasional Paper 19. London: SOAS Water Issues Group; 1999.
99. Ohlsson L, Turton AR. The turning of a screw: social resource scarcity as a bottle-neck in adaptation to water scarcity. *Stockholm Water Front* 2000, 1:10–11 Available at: http://www.siwi.org/documents/Resources/Water_Front/WF-1-2000.pdf.
100. Wolf A, Shira T, Yoffe B, Giordano M. International waters: identifying basins at risk. *Water Policy* 2003, 5:29–60.
101. Dalby S. *Security and Environmental Change*. Cambridge: Polity Press; 2009.
102. Swatuk LA. Environmental security. In: Betsill M, Hochstetler K, Stevis D, eds. *Palgrave Advances in International Environmental Politics*. Basingstoke: Palgrave Macmillan; 2014, 212–244.
103. Bannon I, Collier P, eds. *Natural Resources and Violent Conflict: Options and Actions*. Washington, DC: World Bank; 2003.
104. Homer-Dixon T, Blitt J, eds. *Ecoviolence: Links Among Environment, Population and Security*. Lanham, MD: Rowman and Littlefield; 1998.
105. Brown L. How water scarcity will shape the new century. *Water Sci Technol* 2001, 43:17–22.
106. Starr J. Water wars. *Foreign Policy* 1991, 82:17–36.
107. Pallett J, ed. *Sharing Water in Southern Africa*. Windhoek: Desert Research Foundation of Namibia; 1997.
108. Ruiters G. Urban struggles and defeats in 1980s South Africa. *Urban Forum* 2000, 11:289–310.
109. Asmal K. Water is a catalyst for peace. *Water Sci Technol* 2001, 43:23–30.
110. Savenije HHG, van der Zaag P. Conceptual framework for the management of shared river basins, with special reference to the SADC and EU. *Water Policy* 2000, 2:9–45.
111. Bakker K, Hemson D. Privatizing water: BOTT and hydropolitics in the New South Africa. *Geogr J* 2000, 82:3–12.
112. Pohl B, Carius A, Conca K, Dabelko GD, Kramer A, Michel D, Schmeier S, Swain A, Wolf A. *The Rise of Hydro-Diplomacy: Strengthening Foreign Policy for Transboundary Waters*. Berlin: Adelphi; 2014.
113. Waterbury J. Between unilateralism and comprehensive accords: modest steps toward cooperation in international river basins. *World Resour Dev* 1997, 13:279–289.

114. Conley AH, van Niekerk PH. Sustainable management of international waters: the Orange river case. *Water Policy* 2000, 2:131–149.
115. Delbourg E, Strobl E. *Cooperation and Conflict Between Upstream and Downstream Countries in African Transboundary Rivers*. Paris: Ecole Polytechnique Available at: <http://www.feem-web.it/ess/ess12/files/papers/delbourg.pdf>; 2012.
116. Lambrechts K, ed. *Crisis in Lesotho: The Challenges of Managing Conflict in Southern Africa*. Pretoria: Foundation for Global Dialogue; 1999.
117. Weisfelder RF. Lesotho's interactions with South Africa and regional organizations in Southern Africa'. *South Afr J Int Aff* 2014, 21:109–129.
118. Sadoff CW, Grey D. Cooperation on international rivers: a continuum for securing and sharing benefits. *Water Int* 2005, 30:420–427.
119. Sadoff CW, Grey D. Beyond the river: the benefits of cooperation on international rivers. *Water Policy* 2002, 4:389–403.
120. Klaphake A, Scheumann W. Understanding transboundary water cooperation: evidence from sub-Saharan Africa. In: Swatuk LA, Wirkus L, eds. *Transboundary Water Governance in Southern Africa. Exploring Underexamined Dimensions*. Baden-Baden: Nomos; 2009, 47–72.
121. Scheumann W, Neubert S, eds. *Transboundary Water Management in Africa*. Bonn: German Development Institute; 2006.
122. Turton AR, Meissner R. The hydrosocial contract and its manifestation in society: a South African case study. In: Turton AR, Henwood R, eds. *Hydropolitics in the Developing World: A Southern African Perspective*. Pretoria: African Water Issues Research Unit (AWIRU); 2002, 37–60.
123. Van der Zaag P, Savenije HHG. Towards improved management of shared river basins: lessons from the Maseru Conference. *Water Policy* 2000, 2:47–63.
124. Van der Zaag P, Carmo Vaz A. Sharing the Incomati waters: cooperation and competition in the balance. *Water Policy* 2003, 5:349–368.
125. Van der Zaag P, Seyam IM, Savenije HHG. Towards measurable criteria for the equitable sharing of international water resources. *Water Policy* 2000, 4:19–32.
126. Van der Zaag P. Southern Africa: evolving regional water law and politics. In: Dellapenna JW, Gupta J, eds. *The Evolution of the Law and Politics of Water*. Berlin: Springer; 2009, 245–261.
127. Mirumachi, N. and Van Wyk, E. 2010 "Cooperation at different scales: challenges for local and international water resource governance in South Africa" *Geogr J*, 176, 1, pp. 25–38.
128. Phillips DJH, Allan JA, Claasen M, Granit J, Jagerskog A, Kistin E, Patrick M, Turton A. The TWO analysis: introducing a methodology for the transboundary waters opportunity analysis. Report No. 23. Stockholm: SIWI; 2008.
129. Daoudy M. Getting beyond the environment-conflict trap: benefit sharing in international river basins. In: Earle A, Jagerskog A, Ojendal J, eds. *Transboundary Water Management: Principles and Practice*. London: Earthscan; 2010, 219.
130. Swatuk LA. A political economy of water in Southern Africa. *Water Altern* 2008, 1:24–47.
131. Simon D, ed. *South Africa in Southern Africa. Reconfiguring the Region*. Oxford: James Currey; 1998.
132. Chenje M, Johnson P, eds. *State of the Environment in Southern Africa*. Harare/Maseru: SARDC/SADC; 1994.
133. Jonker L, van der Zaag P, Gumbo B, Rockstrom J, Love D, Savenije HHG. A regional and multi-faceted approach to postgraduate water education – the WaterNet experience in Southern Africa. *Hydrol Earth Syst Sci* 2012, 16:4225–4232.
134. Bowman L. The subordinate state system of Southern Africa. *Int Stud Q* 1968, 12:231–261.
135. Keck ME, Sikkink K. *Activists Beyond Borders: Advocacy Networks in International Politics*. Ithaca, NY: Cornell University Press; 1998.
136. Giordano M, Giordano M, Wolf A. The geography of water conflict and cooperation: internal pressures and international manifestations. *Geogr J* 2002, 168:293–312.
137. Yoffe S, Wolf AT, Giordano M. Conflict and cooperation over international freshwater resources: indicators of basins at risk. *J Am Water Resour Assoc* 2003, 39:1109–1126.
138. Giordano M, Giordano MA, Wolf AT. International resource conflict and mitigation. *J Peace Res* 2005, 42:47–65.
139. Bernauer T, Kalbhenn A. The politics of international freshwater resources. In: Denemark RA, ed. *International Studies Encyclopedia*. Hoboken, NJ: Wiley Blackwell; 2010, 5800–5821.
140. Furlong K. Hidden theories troubled waters: international relations, the territorial trap', and the Southern African Development Community's transboundary waters. *Polit Geogr* 2006, 25:438–458.
141. Cascao A. Changing power relations in the Nile River basin: unilateralism vs cooperation? *Water Altern* 2009, 2:245–268.
142. Cascao A. Ethiopia: challenges to Egyptian hegemony in the Nile basin. *Water Policy* 2008, 10:13–28.
143. Zeitoun M. *Power and Water in the Middle East: The Hidden Politics of the Palestinian-Israeli Water Conflict*. New York: I.B. Tauris; 2009.
144. Zeitoun M, Warner J. Hydro-hegemony: a framework for analysis of trans-boundary water conflicts. *Water Policy* 2006, 8:435–460.

145. Zeitoun M, Mirumachi N. Transboundary water interaction I: reconsidering conflict and cooperation. *Int Environ Agreements* 2008, 8:297–316.
146. Zeitoun, M., Mirumachi, N. & Warner, J. 2011 "Transboundary water interaction II: soft power underlying conflict and cooperation" *Int Environ Agreements* 11, pp. 159–178.
147. Zeitoun M, Allan JA. Applying hegemony and power theory to transboundary water analysis. *Water Policy* 2008, 10:3–12.
148. Mirumachi N, Allan JA. Revisiting transboundary water governance: Power, conflict cooperation and the political economy. In: *Proceedings from CAIWA International Conference on Adaptive and Integrated Water Management: Coping with Scarcity*, Basel, Switzerland, 12–15 November, 2007.
149. Swatuk LA. State interests and multilateral cooperation: thinking strategically about achieving 'wise use' of the Okavango delta system. *Phys Chem Earth* 2003, 28:897–906.
150. Swatuk LA, Kgomotso P. The challenges of supplying water to small, scattered communities in the Lower Okavango Basin, Ngamiland, Botswana: an evaluation of government policy and performance. *Phys Chem Earth* 2007, 32:1264–1274.
151. Kgomotso P, Swatuk LA. Access to water and related resources in Ngamiland, Botswana: toward a more critical perspective and sustainable approach. *Phys Chem Earth* 2006, 31:659–668.
152. Swatuk LA, Wirkus L. *Transboundary Water Governance in Southern Africa: Examining Underexplored Dimensions*. Baden-Baden: Nomos; 2009.
153. Swatuk LA. The state and water resources development through the lens of history: a South African case study. *Water Altern* 2010, 3:521–536.
154. Mokorosi PS, van der Zaag P. Can local people also gain from benefit sharing in water resources development? Experiences from dam development in the Orange-Senqu river basin. *Phys Chem Earth* 2007, 32:1322–1329.
155. Komakech HC, van der Zaag P, van Koppen B. The dynamics between water asymmetry, inequality and heterogeneity sustaining canal institutions in Makanya catchment, Tanzania. *Water Policy* 2012, 14:800–820.
156. Mehta L. The manufacture of popular perceptions of scarcity: dams and water-related narratives in Gujarat, India. *World Dev* 2001, 29:2025–2041.
157. Mehta L. Whose scarcity? Whose property? The case of water in western India. *Land Use Policy* 2007, 24:654–663.
158. Noemdoe S, Jonker L, Swatuk LA. Perceptions of water scarcity: Genadendal and outstations. *Phys Chem Earth* 2006, 31:771–778.
159. Makoa FK. The challenges of the South African Military intervention in Lesotho after the 1998 elections. *Lesotho Soc Sci Rev* 1999, 5:83–109.
160. Matlosa K. The Lesotho conflict: major causes and management. In: Lambrechts K, ed. *Crisis in Lesotho: The Challenges of Managing Conflict in Southern Africa*. Midrand: Foundation for Global Dialogue; 1999, 6–11.
161. Swatuk LA, Vale P. Why democracy is not enough: security and development in Southern Africa in the 21st century. *Alternatives* 1999, 24:361–389.
162. Likoti J. The 1998 military intervention in Lesotho: SADC peace mission or resource war? *Int Peacekeeping* 2007, 14:251–263.
163. Kadima D. The DRC and Lesotho crises: some lessons for the SADC. *Lesotho Soc Sci Rev* 1999, 5:65–82.
164. Van der Zaag P, Juizo D, Vilanculos A, Bolding A, Post Uiterweer N. Does the Limpopo river basin have sufficient water for massive irrigation development in the plains of Mozambique? *Phys Chem Earth* 2010, 35:832–837.
165. Alam U, Dione O, Jeffery P. The benefit-sharing principle: implementing sovereignty bargains on water. *Polit Geogr* 2009, 28:90–100.
166. Turton AR. A South African perspective on a possible benefit-sharing approach for transboundary waters in the SADC region. *Water Altern* 2008, 1:1–21.
167. CSIR. *A CSIR Perspective on Water in South Africa – 2010*. Pretoria: CSIR; 2010.
168. Waughray D, ed. *Water Security: The Water-Food-Energy-Climate Nexus: The World Economic Forum Water Initiative*. Washington, DC: Island Press; 2011.
169. Homer-Dixon TF. The ingenuity gap: can poor countries adapt to resource scarcity? *Popul Dev Rev* 1995, 21:587–612.
170. Government of Sweden. *Transboundary Water Management as an International Public Good*. Stockholm: Ministry of Foreign Affairs; 2001.
171. Swatuk LA, Mazvimavi D. Water and human security in Africa. In: Schnurr M, Swatuk LA, eds. *Critical Environmental Security. Rethinking the Links Between Natural Resources and Political Violence*. New Issues in Security, vol. 5. Halifax, NS: Centre for Foreign Policy Studies; 2010.
172. Swatuk LA, Fatch J. Water resources management and governance in Southern Africa: toward regional integration for peace and prosperity. *Global Dialogue* 2013, 15. Available at: <http://www.worlddialogue.org>.
173. Gleditsch NP. Whither the weather? Climate change and conflict. *J Peace Res* 2012, 49:3–9.
174. Funder M, Mweemba C, Nyambe I, van Koppen B, Munk Ravnborg H. Understanding local water conflict and cooperation. The case of Namwala District, Zambia. *Phys Chem Earth* 2010, 35:758–764.
175. Maganga F, Kiwasila H, Juma I, Butterworth J. Implications of customary norms and laws for implementing IWRM: findings from Pangani and Rufiji basins, Tanzania. *Phys Chem Earth* 2004, 29:1335–1342.

176. Ruiters G, ed. *The Fate of the Eastern Cape: History Politics and Social Policy*. Scottsville: University of KwaZulu-Natal Press; 2011.
177. Bakker K. Archipelagos and networks: urbanization and water privatization in the south. *Geogr J* 2003, 169:328–341.
178. Goldin J. Water policy in South Africa: trust and knowledge as obstacles to reform. *Rev Radic Politic Econ* 2010, 42:195–212.
179. Ruiters G. Environmental racism and justice in South Africa's transition. *Politikon* 2001, 28:95–103.
180. Tapscott C. Social mobilisation in Cape Town: a tale of two communities. In: Thompson L, Tapscott C, eds. *Citizens and Social Movements: Perspectives from the Global South*. London: Zed; 2010.
181. Thompson L, Nleya N. *Community Activism and Protest in Khayelitsha, Cape Town*. Bellville: Accede, UWC; 2010.
182. Gumbo B, van der Zaag P. Water losses and the political constraints to demand management: the case of the City of Mutare, Zimbabwe. *Phys Chem Earth* 2002, 27:805–813.
183. Schnitzler V. Citizenship prepaid: water, calculability, and techno-politics in South Africa. *J South Afr Stud* 2008, 34:899–917.
184. Alexander P. Rebellion of the poor: South Africa's service delivery protests – a preliminary analysis. *Rev Afr Polit Econ* 2010, 37:25–40.
185. McDonald DA, Ruiters G. *Alternatives to Privatization: Public Options for Essential Services in the Global South*. New York: Routledge; 2012.
186. Booysen S. With the ballot and the brick: the politics of attaining service delivery. *Prog Dev Stud* 2007, 7:21–32.
187. Thompson L. Agency and action: perceptions of governance and service delivery among the urban poor in Cape Town. *Politikon* 2014, 41:39–58.
188. Runciman C. Questioning resistance in post-apartheid South Africa: a response to Luke Sinwell. *Rev Afr Polit Econ* 2011, 38:607–614.
189. Sinwell L. Is 'another world' really possible? Re-examining counter-hegemonic forces in post-apartheid South Africa. *Rev Afr Polit Econ* 2011, 38:61–76.
190. Jaglin S. La participation au service du néolibéralisme? Les usagers dans les services d'eau en Afrique subsaharienne. In: M-H Bacque, H. Rey and Y. Syntomer, eds. *Gestion de Proximité et Démocratie Participative: une Perspective Comparative*. La Découverte; 2005, 271–295.
191. Bond P, Mottiar S. Movements, protests and a massacre in South Africa. *J Contemp Afr Stud* 2013, 31:283–302.
192. Mottiar S. From 'popcorn' to 'occupy': protest in Durban, South Africa. *Dev Change* 2013, 44:603–619.
193. Dungumaru EW. Socioeconomic differentials and availability of domestic water in South Africa. *Phys Chem Earth* 2007, 32:1141–1147.
194. Kwaramba A. Engendering management of water resources in Southern Africa. *Rev Afr Polit Econ* 2001, 28:478–479.
195. Van Koppen B. Water reform in sub-Saharan Africa: what is the difference? *Phys Chem Earth* 2003, 28:1047–1053.
196. Schreiner B, Mohapi N, van Koppen B. Washing away poverty: water, democracy and gendered poverty eradication in South Africa. *Nat Resour Forum* 2004, 28:171–178.
197. Wester P, Merrey DJ, de Lange M. Boundaries of consent: stakeholder representation in river basin management in Mexico and South Africa. *World Dev* 2003, 31:797–812.
198. Lankford BA, Tumbo S, Rajabu K. Water competition, variability and river basin governance: a critical analysis of the Great Ruaha River, Tanzania. In: Molle F, Wester P, eds. *River Basin Development in Perspective*. Wallingford: CABI; 2009, 171–195.
199. Magombeyi MS, Rollin D, Lankford BA. The river basin game as a tool for collective water management at community level in South Africa. *Phys Chem Earth* 2008, 33:873–880.
200. Thomasson F. *Local Conflict and Water: Addressing Conflicts in Water Projects*. Stockholm: Swedish Water House; 2005.
201. Raleigh C, Kniveton D. Come rain or shine: an analysis of conflict and climate variability in East Africa. *J Peace Res* 2012, 49:51–64.
202. Msilimba G, Jimu I, Swatuk LA. Transboundary water resources governance in the Songwe River Basin, Malawi and Tanzania: conventional management techniques, local perceptions and developmental needs. In: Swatuk LA, Wirkus L, eds. *Transboundary Water Governance in Southern Africa: Examining Underexplored Dimensions*. Bonn: Nomos Press; 2009, 179–196.
203. Baptista JA. Disturbing 'development': the water supply conflict in Canhane, Mozambique. *J South Afr Stud* 2010, 36:169–188.
204. Mul ML, Kemerink JS, Vyagusa NF, Mshana MG, van der Zaag P, Makurira H. Water allocation practices among smallholder farmers in the South Pare Mountains, Tanzania: the issue of scale. *Agric Water Manage* 2011, 98:1752–1760.
205. Komakech H, van Koppen B, Mahoo H, van der Zaag P. Pangani River Basin over time and space: on the interface of local and basin level responses. *Agric Water Manage* 2011, 98:1740–1751.
206. Buscher B. *Transforming the Frontier: Peace Parks and the Politics of Neoliberal Conservation in Southern Africa*. Durham, NC: Duke University Press; 2013.

207. Franks T, Cleaver F, Maganga F, Hall K. Water governance and livelihoods: outcomes for smallholders on the Usangu plains, Tanzania. *Water Resour Rural Dev* 2013, 1:1–16.
208. Maganga F, Butterworth J, Moriarty P. Domestic water supply, competition for water resources and IWRM in Tanzania: a review and discussion paper. *Phys Chem Earth* 2002, 27:919–926.
209. Koppen V, P. van der B, Zaag EM, Tapela B. Roman water law in rural Africa: the unfinished business of colonial dispossession. *Water Int* 2014, 39:49–62.
210. Kemerink JS, Ahlers R, van der Zaag P. Contested water rights in post-apartheid South Africa: the struggle for water at catchment level. *Water SA* 2011, 37:585–594.
211. Komakech HC, Condon M, Van der Zaag P. The role of statutory and local rules in allocating water between large- and small-scale irrigators in an African river catchment. *Water SA* 2012, 38:115–126.
212. Meissner R. Hydropolitical hotspots in southern Africa: will there be a water war? The case of the Kunene River. In: Solomon H, Turton AR, eds. *Water Wars: Enduring Myth or Impending Reality*. Durban: ACCORD; 2000.
213. Meissner R. Interest groups and the proposed Epupa Dam: towards a theory of water politics. *Politeia* 2005, 24:354–369.
214. Cullis J, Van Koppen B. Applying the Gini coefficient to measure inequality of water use in the Olifants river water management area, South Africa. In: Swatuk LA, Wirkus L, eds. *Transboundary Water Governance in Southern Africa: Examining Underexplored Dimensions*. Baden-Baden: Nomos Publishers; 2009, 91–110.
215. Boege V., 2006. Water governance in Southern Africa – cooperation and conflict prevention in transboundary river basins. BICC Brief 33. Bonn: BICC.
216. Derman B. Environmental NGOs, dispossession, and the state: the ideology and praxis of African nature and development. *Hum Ecol* 1995, 23:199–215.
217. Cleaver F. Institutional bricolage, conflict and cooperation in Usangu, Tanzania. *IDS Bulletin* 2009, 32:26–35.
218. Van der Zaag P. Integrated water resources management: relevant concept or irrelevant buzzword? A capacity building and research agenda for southern Africa. *Phys Chem Earth* 2005, 30: 867–871.
219. Van der Zaag P. Asymmetry and equity in water resources management; critical institutional issues for Southern Africa. *Water Resour Manage* 2007, 21:1993–2004.
220. Jensen KM, Lange RB, Refsgaard JC. Pigs, prawns and power houses: politics in water resources management. DIIS Working Paper 2012:03. Copenhagen: DIIS; 2013.
221. Good K. *Diamonds, Dispossession and Democracy in Botswana*. Johannesburg: Jacana; 2009.
222. Cotula L, Vermeulen S, Leonard R, Keely J. *Land Grab or Development Opportunity? Agricultural Investment and International Land Deals in Africa*. London and Rome: IIED/FAO/IFAD; 2009.
223. Salomão A, Nhantumbo I. *Biofuels, Land Access and Rural Livelihoods in Mozambique. Land Tenure in Africa Series*. London: International Institute for Environment and Development; 2009.
224. Vermeulen S, Cotula L. Over the heads of local people: consultation, consent and recompense in large-scale land deals for biofuels projects in Africa. *J Peasant Stud* 2010, 37:899–916.
225. Rulli MC, Savioli A, D’Odorico P. Global land and water grabbing. *Proc Natl Acad Sci U S A* 2013, 110:892–897.
226. Arezki R, Deininger K, Selod H. What drives the global “land rush”? IMF Working Paper WP/11/251; 2011.
227. Shiva V. *Water Wars: Privatization, Pollution and Profit*. Cambridge, MA: Southend Press; 2002.

FURTHER READING

Le Billon P. The political ecology of war: natural resources and armed conflicts. *Polit Geogr* 2001, 20:561–584.